

Burnett (B. J.)

BURNETT'S

ILLUSTRATED

SYSTEMS OF VENTILATION,

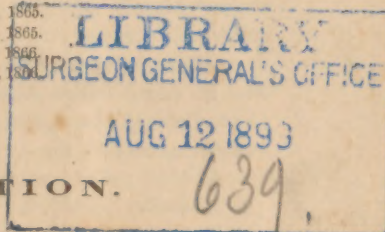
AND

FOR CONSTANTLY RENEWING THE AIR

IN

CONGRESSIONAL, JUDICIAL, CLERICAL AND OTHER
PUBLIC BUILDINGS, PRIVATE DWELLINGS, SHIPS, ETC.,
IN ALL LATITUDES, AND UNDER ALL CIRCUMSTANCES.

PATENT OF JANUARY 10, 1865.
TWO PATENTS OF AUG. 15, 1865.
TWO PATENTS OF FEB. 13, 1866.
ONE PATENT OF MARCH 27, 1866.



FOURTH EDITION.

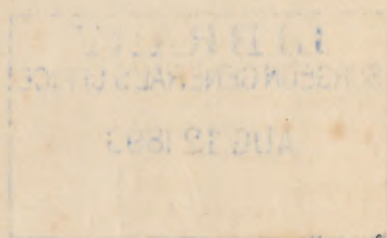
B. J. BURNETT,

MOUNT VERNON, N. Y., AND THE NOVELTY IRON WORKS, EAST TWELFTH STREET, NEW YORK CITY.

NEW YORK:

MACDONALD & SWANK, PRINTERS, 37 PARK ROW.

1867.



INTRODUCTION.

WE are dwelling at the bottom of an immense ocean of air, which presses upon all sides of us with the weight of tons. It accompanies us into all places, unless by special arrangements we contrive to bar it out. After all that the infinitely wise Creator has done to supply us with this first and highest of earthly necessities, we ungratefully refuse to admit it into our dwellings, stores or workshops; but choose, rather, to cut ourselves off from the beneficent and all-invigorating atmosphere, by retiring into air-tight apartments, and using the same gases over and over again, as if they were a taxed commodity, and we all misers. It is because the air is so abundant and all-pervading, and therefore costs no exertion to obtain it; and also because it is an invisible and ethereal medium; and therefore not fitted to strike the senses like most other forms of matter, that its relations to animal life have been but so recently determined, and that so little attention is generally paid to a copious and healthful supply of it, in the arrangements of our buildings.

The need of ventilating, renewing or exchanging the air in any and all apartments where people live, is no longer questioned by those who choose to examine and think upon this important subject; and all such admit that the subject of a perfect system of ventilation, is one of the most important questions of this day. The undersigned, with others, believing that his system will meet every requirement in that direction, takes this as one of the modes of bringing it before the public. This system consists of various devices of applying his plan for renewing the air in apartments, which meets all and every case that is likely to arise, either in parlors, dining and sleeping rooms; kitchens and basements; cellars, vaults, and water-closets; tenement houses; school, lecture, and court rooms; churches; legislative halls; poor-houses, prisons, and hospitals; factories; breweries and distilleries; railroad cars; stores of all kinds; banking houses, hotels, and restaurants; fruit and provision closets; pork-packing houses; meat houses for hotels, butchers, etc.; stables; and is as readily adapted to Ships' holds, cabins and state-rooms. The foul air is taken away and fresh air introduced, without creating any draft or annoyance to any one from a current of air, thereby insuring health, safety and comfort to all Public and Private buildings, Voyagers, Cargoes, and Railroad travellers. *These beneficial effects are not produced by artificial heat nor by any inflammable agent; therefore insurances are not jeopardized by its adoption—more than that, my Motor is immutably constant, self-regulating; and is to be had "without money and without price."*

The misfortune of one of the most efficient and well intended devices for removing impure air by artificial heat is this, it forms but one end of ventilation, and modestly assumes that bad workmanship will leave open joints

which, together with key holes, will form the other; if this could be so, why not let bad joints, key holes, cracks and crevices perform the whole work of ventilation? Another method of ventilation is attempted, relying on an inequality in length of its air shafts; this is *en petite* theoretically correct, provided the top of one of its air shafts is sufficiently high above the other one, so that the atmospheric pressure will be much less at the top of the long shaft than it is at the top of the short one; and then, of course, if both shafts terminate in the same apartment, the air will flow down the shorter and up the longer one; but the necessary inequalities of height will rarely be accurately arrived at in practice.

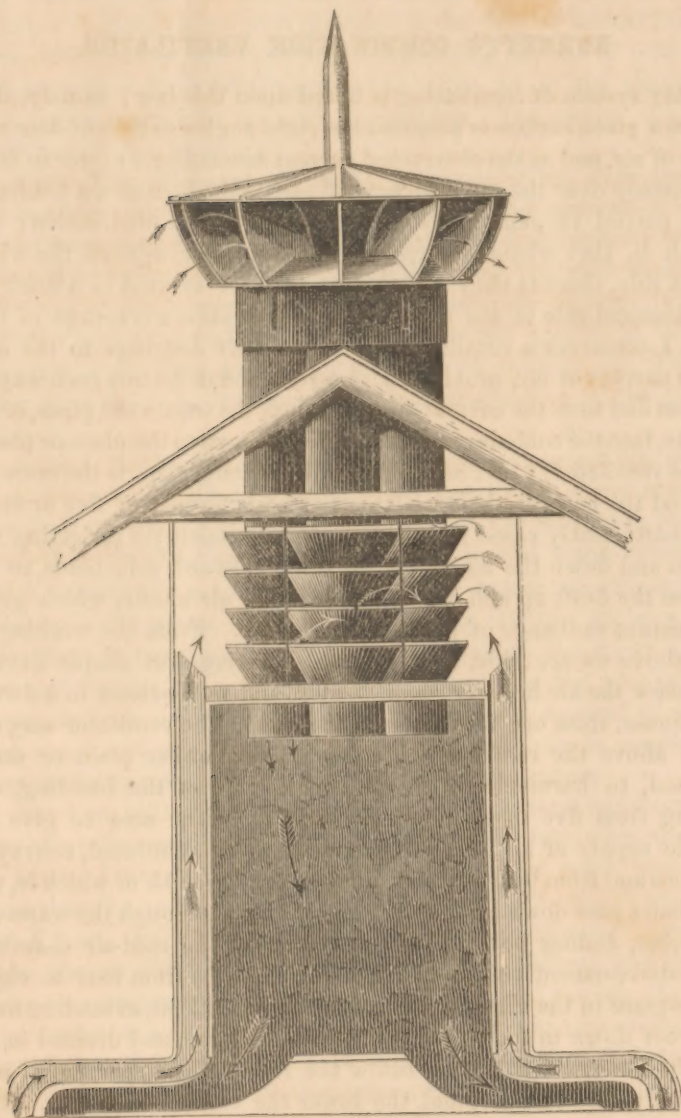
Now, the results of these attempts at ventilation have continually proved abortive in various localities; cases in point are to be found here in New York when the wind is south or southwest—but, by the system I inaugurate, such conditions cannot exist. I show and secure (practically) favorable features and results from all bearings of the wind; no matter whether a zephyr sighs or a hurricane howls.

My system has been thoroughly tested, and, it is only the truth to say, is a perfect success: it is not only theoretically correct, but practically so; and will well repay any who view ventilation as a necessity to call and examine it. It is perfectly applicable to old buildings and ships.

All communications on the subject may be addressed to B. J. BURNETT, Novelty Iron Works, New York, or to ABNER MILLS, 125 Avenue D. New York.

B. J. BURNETT.

BURNETT'S COMBINATION VENTILATOR.



BURNETT'S COMBINATION VENTILATOR.

My system of ventilating is based upon this law ; namely, that when a given surface is presented at right angles to the out-door current of air, and as the obstructed current accumulates power to force a passage over the top and around each side, it causes a tendency to a partial vacuum on the leeward side of the obstruction ; the result is, that whatever pressure there may be against the windward side, there is the same amount of force exerted in a draft on the leeward side of the same. In order to take advantage of this law, I construct a ventilator which presents openings to the out-door current of air, provided with a roof and deflectors each way to deflect and turn the current down through the windward pipes, or air shafts, into the cold-air reservoir (or direct down to the place or places to be ventilated) ; and as the deflecting arrangement is the same all around the head of the ventilator (which is formed of five or more air shafts neatly cased in), the same arrangement for deflecting the air in and down the air shafts on the windward side tends to increase the draft up and out of the leeward air shafts, which gives a constant exchange of pure air for impure. From the working of the above we are able, by a new and unerring, but simple device, to renew the air in every room, pantry, and water-closet in a dwelling house, from one ventilator on the roof. The ventilator may extend above the roof from three to six feet, either plain or ornamented, to harmonize with the architecture of the building, enclosing from five to eight air shafts of sufficient area to give an ample supply of air to each apartment to be ventilated, conveyed thereto and from by concealed pipage ; the *rationale* of which is, the air shafts pass down through the roof into and through the warm-air chamber, ending just below the ceiling of the cold-air chamber. The above-named chambers are required to be from four to eight feet square in the clear, eight feet or more in height, extending from the roof down to the upper floor of the building, and divided in its height about thirty inches below the roof. The upper part I call the warm-air chamber, and the lower the cold-air chamber. The outward half of the air shafts in the warm chamber, about twenty-four inches in height, is cut and bent out at right angles to each other, and circular conical flanges inserted and riveted horizontally

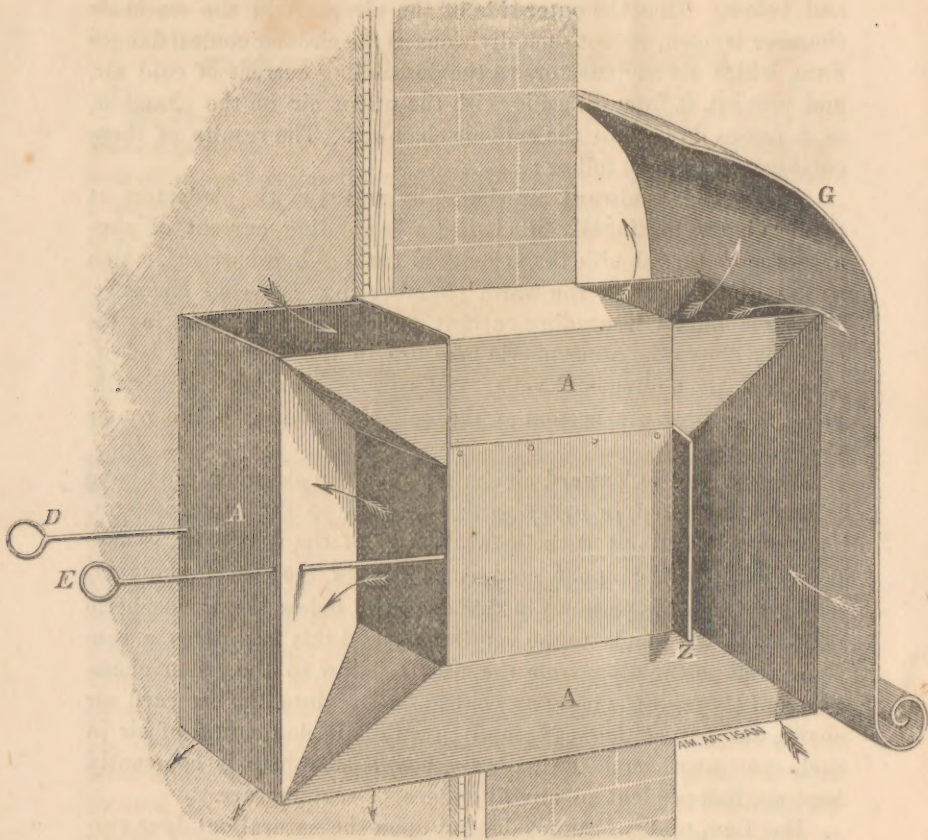
from one angular part of the pipe to the other, about three inches above each other. The inner edge of the flange, which is the lowest, forms a circle and leaves the same area as the air shafts above and below. Thus the outer side of the air shaft in the warm-air chamber is open, except such divisions as the circular conical flanges form, which act as deflectors to the descending current of cold air, and prevent it from diffusing with the warm air in the chamber, as it passes down into the cold-air chamber. The results of these combinations are as follow :

First. The windward air shafts, by means of the deflectors at the head, are continually filled with a descending current of pure air (of more than double the velocity of the out-door current), which passes direct through the warm chamber into the cold chamber. The force of this descending current increases the pressure in this chamber above the atmospheric pressure in the apartment below. This fact gives force and velocity of current through the distributing pipes from the bottom of the cold-air chamber to the rooms below.

Second. In the leeward air shafts and warm chamber, the above is simply reversed in every particular, and to the same amount. The draft up and out at the leeward side of the ventilator is supplied through the upper conical flanges in the warm chamber, which reduces the pressure in this chamber below the atmospheric pressure in the rooms to be ventilated; and this fact gives a constant draft to the pipes from the rooms below to the warm chamber, and through the circular conical flanges into the leeward air shafts, and out at the head; and so an infallible renewal of air in each apartment connected with these two chambers is constantly kept up, independent of any difference of temperature.

But I am told we cannot depend upon the natural out-door current of air for ventilation, there being so many days when there is no wind. I have, therefore, during the last eight years, bestowed some thought and not a little care to ascertain if such is the fact, and I have never yet found a time of fifteen minutes' duration when the air did not move over fifty feet per minute; and should there be such a calm for ten hours each day, and the air shaft in my ventilator were only one foot in area, and but two of them to the windward, by my system of ventilation we should distribute 6000 cubic feet of pure air throughout the building per hour, and of course remove the same amount of the impure.

BURNETT'S HORIZONTAL VENTILATOR.



This style of Ventilator is adapted to side walls of buildings, to ventilate apartments of any size through the same.

Its adaptation to all sleeping apartments must be experienced before it can be fully appreciated.

All state-rooms above the main deck of steamers and other vessels may be rendered healthy and comfortable by inserting this Ventilator, but the area of the room and number of inmates must always regulate the size and number of Ventilators to be used.

Its mode of operation is: The top and bottom air-boxes are not much affected by side currents of out-door air; but the side air-boxes are principally controlled by them; in this way the air flows in on the windward side, which increases the pressure of air in the room; at the same time the wind, in passing over the outside end of the Ventilator, tends to a partial vacuum,

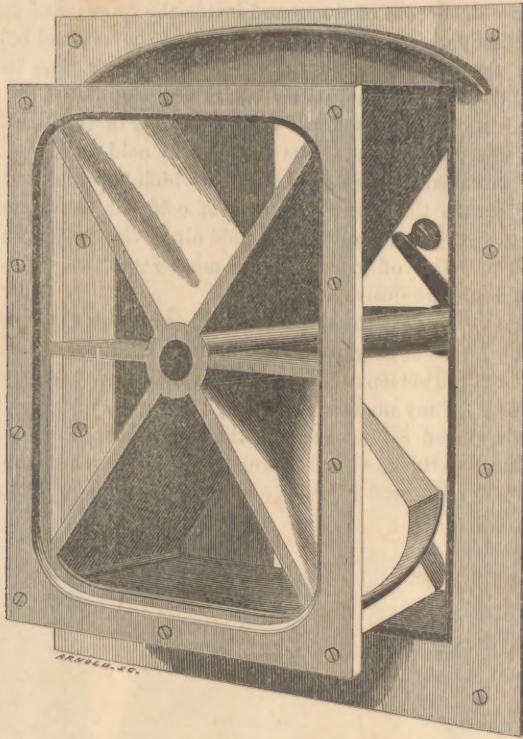
and assists to accelerate the outward motion of the warm, impure air from within, through the leeward side of the Ventilator.

The top and bottom air-boxes are mainly controlled by the difference in the temperature of air out of doors and inside the room; and again, by the differences of temperature existing in the air at the top and bottom of the Ventilator, in the room—that is, the warm impure air rises to the top of the room, and flows out at the top air-box of the Ventilator as fast as the heavier cool air flows in through the bottom air-box of the Ventilator.

In order to guard against injurious currents of cold air in the room, each Ventilator is furnished with a diffusing hood which is perforated with small holes, which breaks the inward current of cold air into small streams; thereby presenting a greater surface of cold air to the heated impure air in the room, the diffusion of gases become more rapid, and all currents of cold air in the room are destroyed.

It is often asserted that the impure air falls and rests on the floor of the apartment; this is so, but only under the following circumstances—where (for example) one hundred persons are shut up in a room twenty feet square for five or six hours, without any mode of supplying them with pure air; under such and similar circumstances the excess of this poisonous gas over pure atmospheric air *must* fall to the floor; but this can never occur where there is a sufficient supply of oxygen, and I propose by my apparatus to give this supply without intermission.

BURNETT'S SIDE-LIGHT AND STATE ROOM VENTILATOR FOR SHIPS.



This Ventilator is constructed for the following purpose, viz. :

That where side-light openings are necessarily cut through the hull of a ship for the admission of light to state-rooms, pantries, etc., the openings may be made to serve the double purpose of ventilation as well as light, and at the same time form a safe and tight shutter when closed against the pressure of water outside.

It will be seen that the bearings of the wings in each angle, work on finished surfaces; which will not admit of any fore-and-aft or vertical motion.

The outboard and inboard motions are controlled by a strong screw, working through the hub of the cast wings, and resting in a bearing formed in the cross-bar inboard of the opening. This screw may, and should, have a quick thread, to give a rapid motion outboard and inboard to the wing-light deflector.

The operation is as follows: When the wind is directly against the side of the vessel the air will pass in through all of the openings, if the state-

room doors are open, or if there be any other openings for the egress of the incoming current of air. If not, and the apartment is a closed one, then the air will flow in through three sides of the Ventilator, displacing the warm and impure air, forcing it out through the top opening of the Ventilator. And when the wind is forward or aft a current of pure air flows in the windward side of the Ventilator, and the impure air out of the top and leeward side of the same.

But when there is a perfect calm, and the temperature inside is higher than that of the outside air, there will be a constant flowing in through the bottom air-duct of cool air, and a corresponding outward motion of warm air through the top. This is invariably so.

This ventilator excels all others in use in the following particulars :

Firstly, in the rapidity and ease of opening and closing.

Secondly, in the simplicity of construction and durability of parts.

Thirdly, in giving transverse bearings to the glass which supports the same against the pressure of the sea.

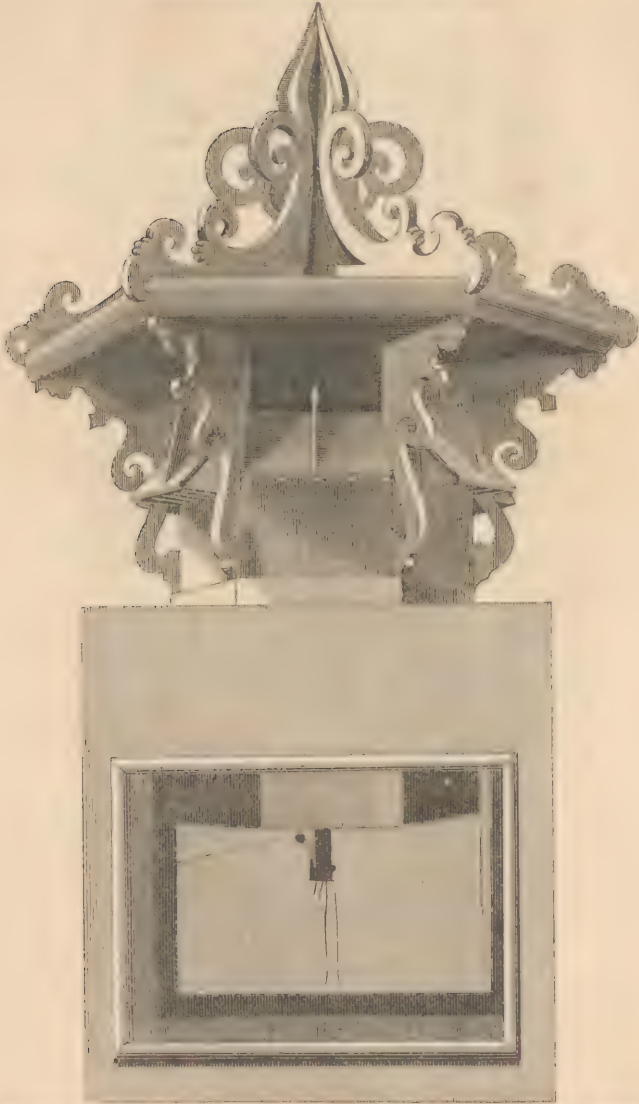
Fourthly, the outside pressure tends to close it more securely against leakage.

Fifthly, that in a storm it may be locked, so as to be out of the control of thoughtless passengers.

Sixthly, it combines a perfect side-light and ventilator in one.

P. S.—The Pacific Mail Steamship Company are having 106 of these ventilators fixed in their new steamer "Japan."

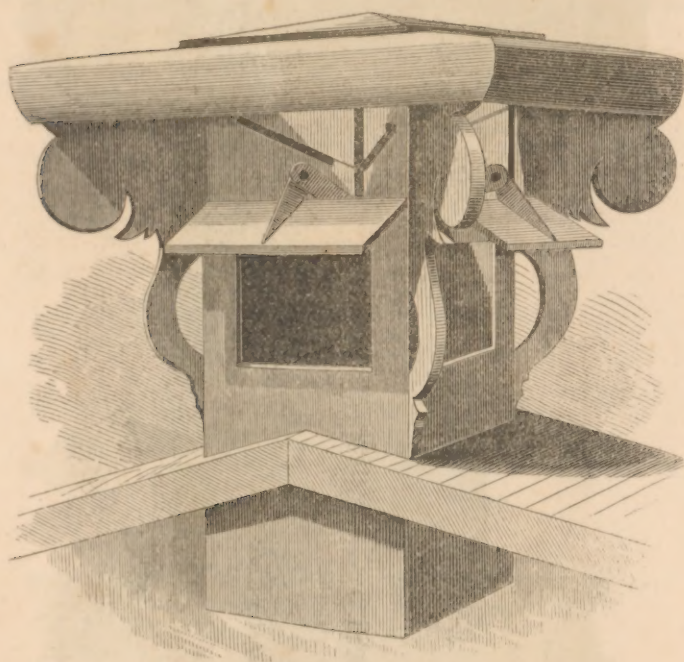
THE HEXAGON VENTILATOR.



The top story or attie rooms of all dwelling-houses are rendered almost useless during the Summer months from the action of the sun upon the roof; these rooms may not only be kept at about the same temperature as those below during the heat of Summer, but may be rendered healthy and sweet both Winter and Summer by a constant exchange of air by means of this system of ventilation.

The style of which may be varied in size, shape, and finished to almost any extent desirable; and it may be constructed wholly, or partly, of metal. It is intended principally to ventilate the space between the roof and upper ceilings of dwellings; and when required, tin or sheet-iron pipes are used to connect the ventilator to the upper sleeping apartments, keeping them in a healthy condition. This, as well as all others of my ventilators, is supplied with a proper and simple arrangement to control and graduate the incoming current, and to close them in any severe driving snow-storm.

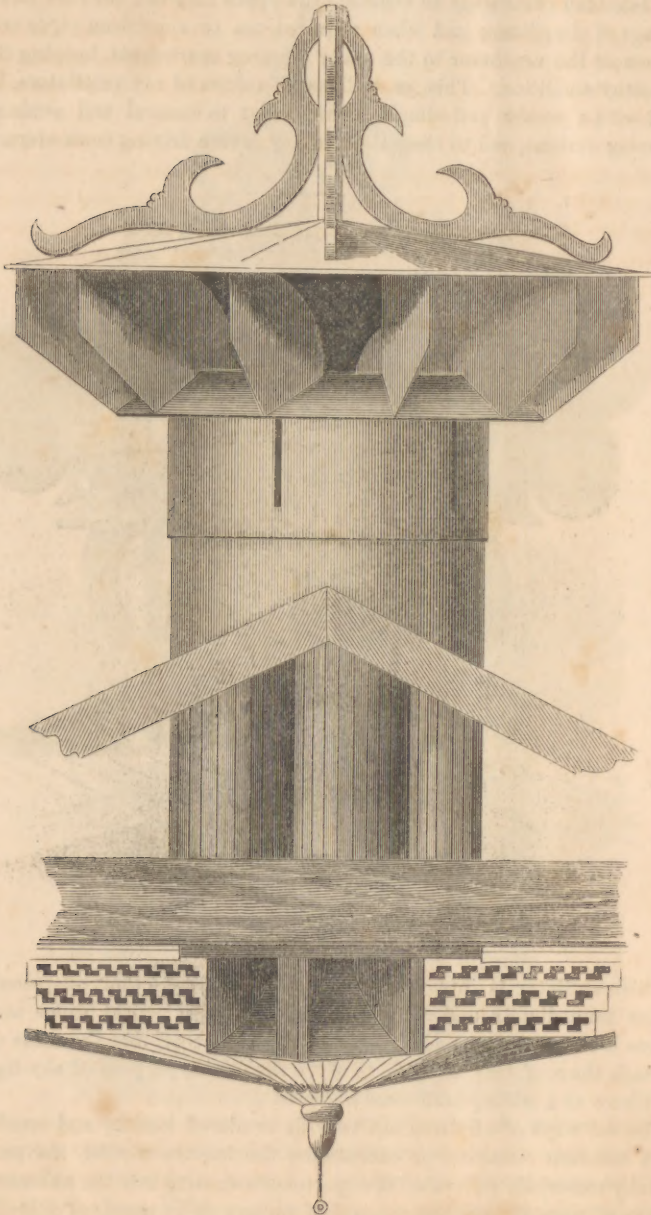
THE SKY-LIGHT VENTILATOR.



This ventilator is intended for halls, offices, and other apartments and places immediately under the roofs of dwellings, stores, shops and lofts, where it is necessary to admit light through the roof, that the same opening through the roof may be made to serve the double purpose of sky-light and ventilator at a trifling additional expense.

The hallways of all dwellings may be rendered healthy and comfortable by a constant renewing or exchanging the impure air for the pure, and thereby materially relieve all the apartments opening into the hallway by the supply of pure air, and the removal of impure air by means of this sky-light ventilator.

A CHURCH AND HALL VENTILATOR.



The above represents an apparatus for the ventilation of Churches, Halls, Banking Rooms, Theatres, etc. Here the air shafts terminate below the ceiling of the room, with curved deflectors, in order to turn the downward current off horizontally, and to pass it through the perforated sides of the ornamental diffusing-hood, thus effectually preventing a *current* of air reaching down abruptly to the Congregation, Audience or inmates. The operation is controlled by outside currents of air, and be the movement "never so sluggish," *still*, "*it moves*," and the result of this movement is an infallible, a *natural* and a constant exchange of the impure air inside for pure air from the height without, uncontaminated as yet by the lower *miasmated* atmosphere. As may be seen, arrangements are made so as to easily graduate the amount of *circulation*, in order to regulate the temperature to a pleasant condition in the Winter season; for it should be borne in mind, ventilation is more needed in Winter than during the Summer.

A ventilator of this style may be seen in operation at Messrs. BROWN BROTHERS & Co., Bankers, 59 Wall Street, N. Y.

TESTIMONIALS.

MR. B. J. BURNETT, *Novelty Iron Works, New York :*

NEW YORK, July 13, 1866.

DEAR SIR: It gives me much pleasure to state that your "Patent Ventilator," applied to my residence at Rye, has given entire satisfaction. The attic rooms during the recent unusually warm weather have been more cool than those on the second floor.

Yours very truly,

W. E. EVERETT.

OFFICE OF THE NOVELTY IRON WORKS, }
NEW YORK, July 11, 1866. }

B. J. BURNETT, Esq.:

DEAR SIR: In answer to your inquiry as to results received from the Ventilator put up by you at my house at Mount Vernon, I cheerfully comply by stating that the rooms (particularly the sleeping apartments) were, before the introduction of it, very close and warm, and are now quite pleasant and cool.

I am, truly yours,

WILLIAM HATHAWAY.

OFFICE OF THE NOVELTY IRON WORKS, }
NEW YORK, July 3, 1866. }

B. J. BURNETT, Esq.:

MY DEAR SIR: I have used two of your Ventilators on my house with great success; the rooms in which I put them are greatly cooler in hot weather than they ever were before, and our attic, which we could not use before with any comfort, is now a very comfortable place.

I am sure it is the most perfect mode of ventilating possible.

Yours,

J. W. STRATTON.

B. J. BURNETT, Esq.:

NEW YORK, January 18, 1865.

SIR: Your Ventilators, as put up on the Novelty Yard smith shop, during the winter of 1863 and 1864, in a practical point of view exceed my expectations.

I find a constant current of fresh air is, at all times, flowing in the shop, while at the same time an equal quantity of the noxious gases is escaping.

I would most cheerfully commend your invaluable Ventilators to all parties desiring such an improvement.

JOSEPH DALLY,

Foreman Smith Shop, Novelty Iron Works.

B. J. BURNETT, Esq.:

MOUNT VERNON, N. Y., January 21, 1865.

SIR: I had a good opportunity, during the Summer of 1864, of testing the merits of your Ventilator, as applied to the cooling of rooms situated under a flat metal roof, and can say that I was highly pleased with the results.

Dormitories hitherto very uncomfortable, on account of the hot air between the roof and the ceiling, were rendered quite agreeable during the heat of the day, and at night the temperature was much lower than ever before. I think that you have discovered the true principle for a Ventilator, and am confident that its application will give general satisfaction.

Yours, very truly,

WILLIAM HOWE.

MR. B. J. BURNETT, Novelty Iron Works:

NEW YORK, September 7, 1867.

DEAR SIR: It affords us much pleasure to say, after a year's experience of the working of the ventilating apparatus which you devised for our office, that it more than equals our expectations, being at once simple, easily managed, and perfectly efficient.

It is indeed very much the best thing for the purpose of ventilation that we have any knowledge of, and we had made trial previously, in our former office, of other plans.

We are, your friends,

BROWN, BROTHERS & CO.